PC AU03/01610

Patent Office
Canberra

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002953139 for a patent by T.A.C.A. AUSTRALIA PTY. LTD. as filed on 04 December 2002.

WITNESS my hand this
Fourteenth day of January 2004

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

This invention is described in the following statement :

The present invention relates to a method and apparatus for the dispensing of a material or measured amount of welding material from a hopper or the like container housing a supply of such material. More particularly, the invention relates to an improved method and apparatus for the dispensing of particulate welding material such as a carbide for welding purposes.

In this specification the word "particulate" includes the case where the material is granulated.

This application is for improvements to that disclosed in Australian Patent No. 753910 (61378/00) in the name of the present applicant. The several elements of the parent patent are designed to produce a metered dispensation of a particulate material. The present application is concerned with improvements in various aspects of the parent application to effect:

1. improved metered dispensation; and
2. improved welding resulting from particular application of metered welding material.

Accordingly this invention provides a method for the metered dispensation of a particulate welding material which comprises :

(a) establishing a primary flow of such material;

(b) extracting from such primary flow a determined secondary flow of such material; and

(c) recycling such secondary flow to such primary flow in such a manner that a metered dispensation of such material is obtained,

wherein the improvement comprises adjusting the primary flow through a first hopper in such a manner that a desired size/weight range of particulate material is delivered.

Preferably the adjustment of primary flow is achieved by restricting to a predetermined extent the flow of particulate material from the first hopper.

This invention also provides an apparatus for the metered dispensation of a particulate welding material which comprises :-

(a) a first hopper having a first inlet means and a first outlet means;

(b) a second hopper in flow connection with the first hopper and having a second inlet means and a second outlet means;

(c) a take-off means in combination with the second hopper and adapted to remove a selected amount of particulate material from a flow of such material through the first and second hoppers; and

(d) a recycling means adapted to return the selected amount of particulate material to the first hopper,

wherein a restrictor means is inserted in the first outlet means to restrict the flow of particulate material to a predetermined extent.

The restrictor means preferably comprises one or more of a range of collets which is/are inserted into the bottom of a conical discharge chute leading from the first hopper to alter the Venturi effect controlling the rate of exit of the particulate material from the first hopper. The size of the collet allows a particular, desired size of particulate material to be passed. Thus, if the Venturi portion is too wide then, depending on the size of the particulate material, the Venturi can be flooded. If it is too narrow, no or too little particulate material is passed. It is generally desired that the particulate material should act in a fluid manner as it is passed through the Venturi tube.

Preferably a deflector means is inserted into a preliminary hopper to ensure that a relatively high proportion of medium to large size particulate material is passed to the first hopper.

More preferably a screening filter is attached to an out-take from the preliminary hopper to ensure that only fine dust is extracted from the system.

Yet more preferably an injection tube connected to the outlet from the second hopper is located at an optimum angle to the horizontal whereby :

(e) the particulate welding material drops behind the flash area caused by ignition of a welding wire; and

(b) the particulate welding material does not drop so far from the flash area that a weld pool is not formed.

As stated in the Australian patent, this invention is particularly suitable for the use of tungsten carbide chips for welding together with such other additives known in the art.

In order that the invention may be more clearly understood and put into practical effect reference will now be made to preferred embodiments of a method and apparatus in accordance with the present invention.

The ensuing description is given by way of non-limitative example only with reference to the accompanying drawings, in which :

Fig.1. is a side elevational and schematic view, partly in cross-section, of an embodiment of the apparatus in accordance with the present invention; and

Fig.2. is a cross sectional view of part of the apparatus of Fig.1.

With particular regard to Fig.1., there is illustrated a first hopper 1 for housing a replenishable supply of a melting material in particulate form. An initial charge of particulate material of generally selected size is added through the top of first hopper 1. Preferably first hopper 1 is substantially funnel-shaped having a conical discharge chute 2 at its lower end. Numeral 3 relates to a centrally disposed open tube at the bottom of chute 2.

Any suitable means may be employed to control the overall flow of particulate material out of first hopper 1 into second hopper 10. For example, a gate means 4 comprising a piston 6 and a closure means 5 may be used, closure means 5 being moved into and out of co-operation with centrally disposed open tube 3.

Item 4A refers to means for cleaning open tube 3 by the use of a jet of compressed gas, such as compressed air.

Numeral 1A refers to a collet insertable into centrally disposed open tube 3 to further control flow of the particulate material. By this means the Venturi effect in the region of centrally disposed open tube 3 may be altered as desired with a consequent effect on the flow of particulate material.

Second hopper 10 is disposed immediately below first hopper 1 and is adapted to retain for a time particulate material exiting from first hopper 1. Means to extract a proportion of the flow of particulate material is provided in co-operation with second hopper 10. This proportionate flow is recycled to preliminary hopper 20. This means is exemplified in Fig.2. by an elongate hollow member 12 slidable in a fixed sleeve 13 which penetrates side wall 11 of second hopper 10. Elongate hollow member 12 is shaped to penetrate the flow of particulate material emerging from centrally disposed open tube 3.

In the embodiment shown, elongate hollow member 12 is advanced or retracted using arm members 16 and 17 attached to sleeve 13 and elongate hollow member 12 respectively. Movement of elongate hollow member 12 may be obtained using a screw member 18 penetrating arm members 17 and 18 respectively.

Other means to extract a proportion of the flow of particulate material are described in the parent patent.

A proportion of particulate material is recycled to preliminary hopper 20 by means of return by-pass hose 19. A semi circular deflector tube 19A, preferably made of tungsten or a tungsten alloy, is fitted to the end of by-pass hose 19, internally of preliminary hopper 20. This deflector tube 19A ends in a deflector plate 19B at right angles to the axis of the tube.

A vacuum shut-off ball 21 is fitted within cage 22 at the bottom of return storage cone 23. A screening filter 24 is fitted to the upper outlet of preliminary hopper 20 to capture all but very fine dust.

When vacuum is applied through connecting pipe 25, ball 21 rises in cage 22 shutting off first hopper 1 resulting in particulate material being dragged through hose 19 to deflector tube 19A. When this operation is complete the vacuum is shut off and hopper 1 refills with larger sized material.

Turning now to the particulate material flowing through conical discharge chute 14, 15 at the bottom of second hopper 10 and into funnel 49. Tthis material flows to injection tube 50 whereby the particulate material may be injected into a weld pool. A second injection tube 51 is shown to carry a wire feed for a MIG torch. Injection tube 51 also carries argon gas to bathe the weld pool. An adjustable tie means 52 is also shown whereby the relative angles of attack of injection tubes 50 and 51 may be altered as well as their relative distances from the weld pool.

The operation of the apparatus according to the invention has been described by reference to manual control. Various aspects of the method and apparatus may be automatically controlled within the scope of the invention. Other modifications may be made to the method and apparatus remaining within the scope of the claims.

Dated this 30th day of November 2002

T.A.C.A. Australia Pty Ltd.

By its Registered Patent Attorney

JAMES MURRAY

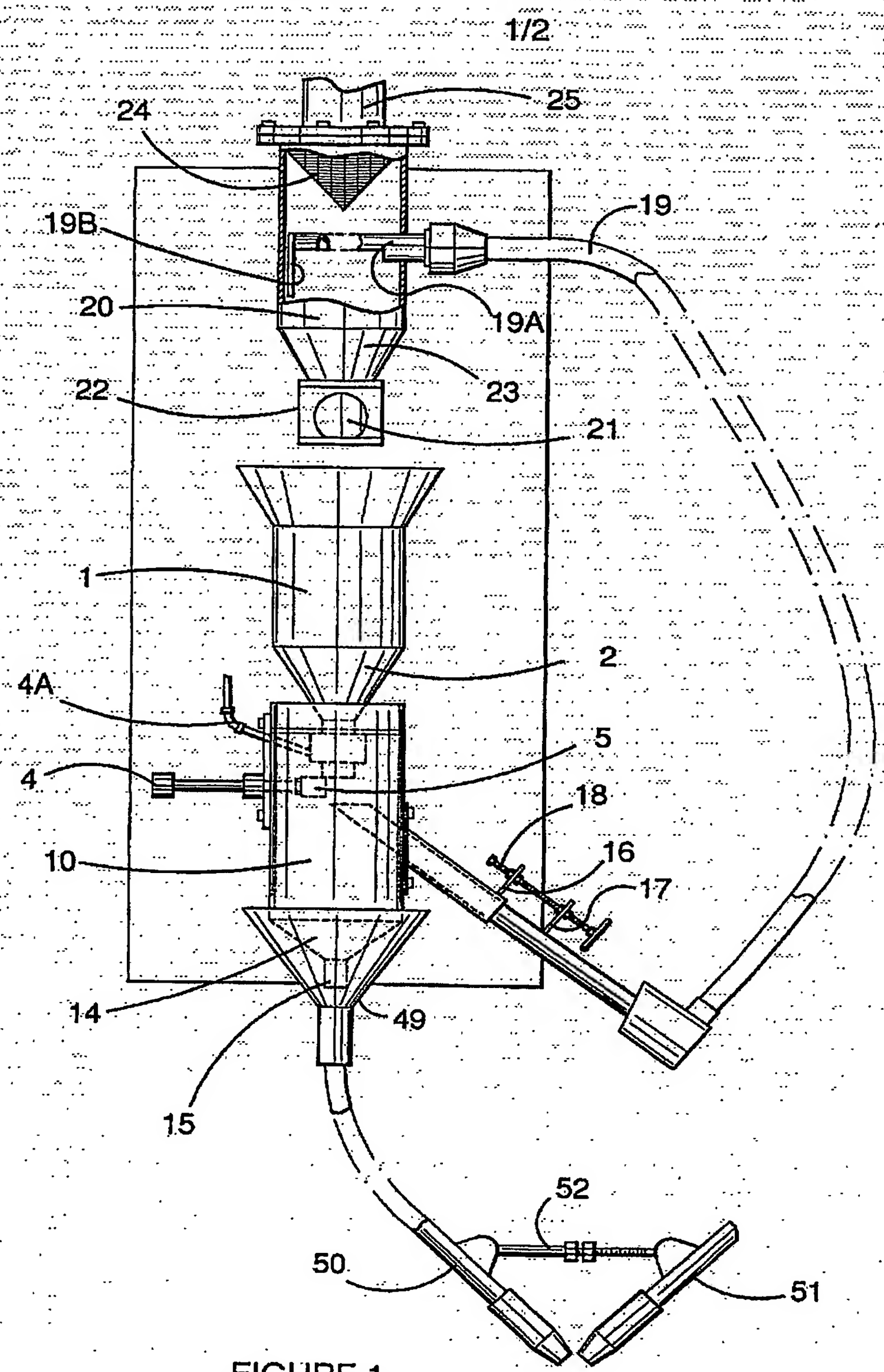

FIGURE 1

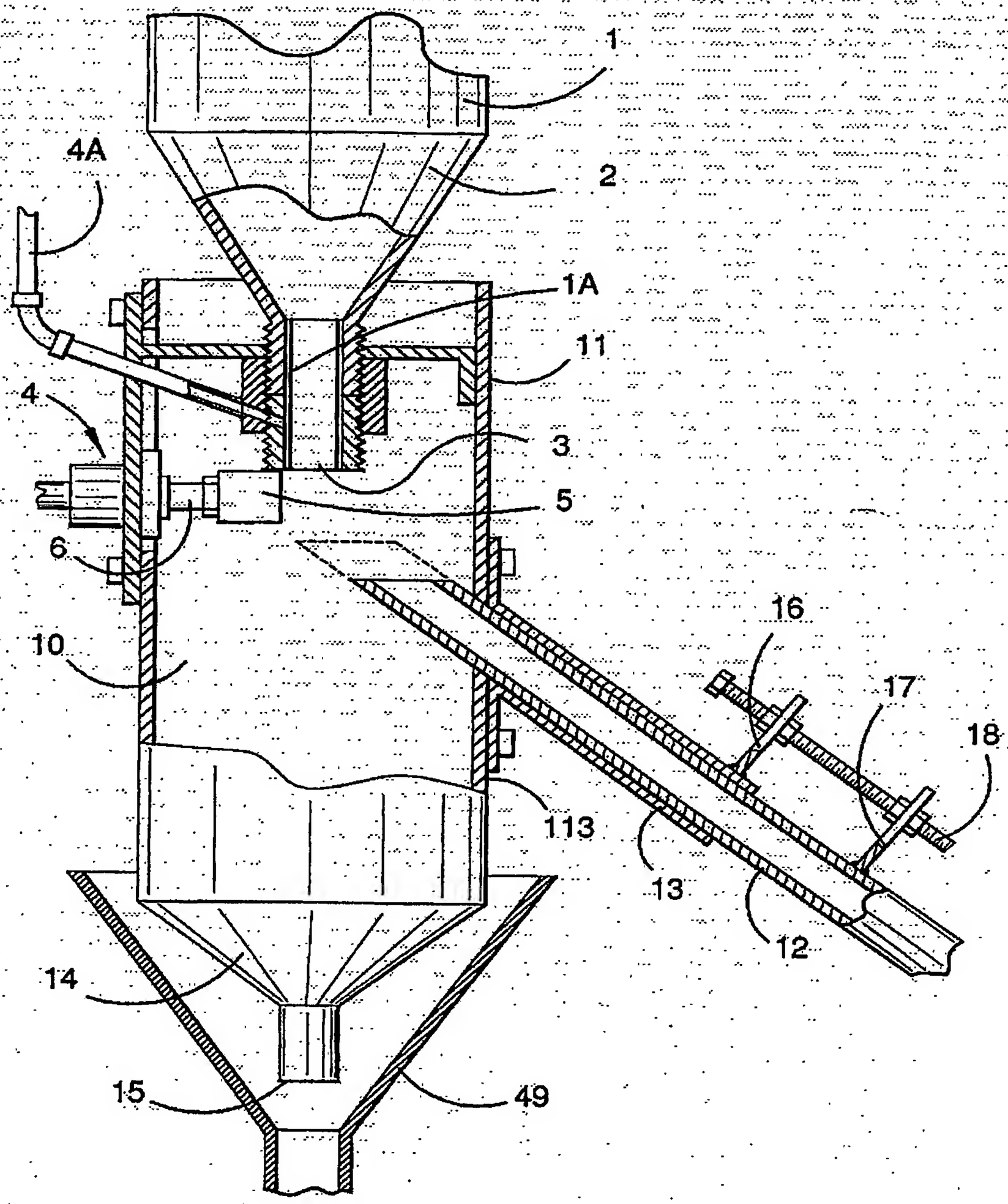

FIGURE 2